

**WEST****End of Result Set**

Generate Collection

L43: Entry 1 of 1

File: USPT

Feb 26, 1991

US-PAT-NO: 4996663

DOCUMENT-IDENTIFIER: US 4996663 A

TITLE: Methods and apparatus for decontaminating hash tables

DATE-ISSUED: February 26, 1991

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nemes; Richard M.	Brooklyn	NY	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Bell Communications Research, Inc.	Livingston	NJ	N/A	N/A	02

APPL-NO: 7/ 151638

DATE FILED: February 2, 1988

INT-CL: [5] G06F 12/00

US-CL-ISSUED: 364/900; 364/962.1, 364/963.3, 364/967.5, 364/974.5

US-CL-CURRENT: 707/200; 711/216

FIELD-OF-SEARCH: 364/2MSFile, 364/9MSFile

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

Search Selected

Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>4121286</u>	October 1978	Venton et al.	364/900 X
<input type="checkbox"/> <u>4215402</u>	July 1980	Mitchell et al.	364/200
<input type="checkbox"/> <u>4447875</u>	May 1984	Bolton et al.	364/200
<input type="checkbox"/> <u>4502118</u>	February 1985	Hagenmaier, Jr. et al.	364/200
<input type="checkbox"/> <u>4716524</u>	December 1987	Oxley et al.	364/200
<input type="checkbox"/> <u>4775932</u>	October 1988	Oxley et al.	364/200

## OTHER PUBLICATIONS

"Data Structures with Abstract Data Types and Pascal," D. F. Stubbs and N. W. Webre, Brooks/Cole Publishing Company, 1985, Section 7-4, Hashed Implementations, pp. 310-336.

"Hints for Computer System Design," Butler W. Lampson, IEEE Software, Jan. 1984, p. 23.

"Grapevine, An Exercise in Distributed Computing," Birrell et al., Communications of the ACM, vol. 25, No. 4, Apr. 1982, pp. 260-274.

"Walnut & Storing Electronic Mail in a Database," Donahue et al., Palo Alto Research Center, Nov. 1985, pp. 1-20.

"The Art of Computer Programming", Sorting and Searching, D. E. Knuth, Addison-Wesley Series in Computer Science and Information Processing, pp. 506-549, 1973.

"Data Structures and Program Design", R. L. Kruse, Prentice-Hall, Inc., 1984, Section 3.7, Hashing, pp. 112-126.

ART-UNIT: 237

PRIMARY-EXAMINER: Shaw, Gareth D.  
ASSISTANT-EXAMINER: Kulik, Paul  
ATTY-AGENT-FIRM: Falk; James W.

## ABSTRACT:

A method and apparatus for performing storage and retrieval in an information storage system is disclosed which uses the hashing technique. In order to prevent contamination of the storage medium by deleted records, a hybrid hashing technique is used which uses a fast, contaminating deletion of records during times of heavy load on the system, but uses a slow, non-contaminating deletion when the load on the system is not as heavy. The slow, non-contaminating deletion automatically removes previously generated contamination in the vicinity of the slow, non-contaminating deletion, thereby automatically decontaminating the storage space. Because no long term contamination can build up in the present system, it is useful for large data bases which are heavily used and which require the fast access provided by hashing.

6 Claims, 10 Drawing figures

**WEST****End of Result Set****Generate Collection**

L42: Entry 1 of 1

File: USPT

Jun 9, 1992

US-PAT-NO: 5121495

DOCUMENT-IDENTIFIER: US 5121495 A

TITLE: Methods and apparatus for information storage and retrieval utilizing hashing techniques

DATE-ISSUED: June 9, 1992

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nemes; Richard M.	Brooklyn	NY	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Bell Communications Research, Inc.	Livingston	NJ	N/A	N/A	02

APPL-NO: 7/ 430901

DATE FILED: October 31, 1989

## PARENT-CASE:

This application is a continuation of application Ser. No. 07/151,639, filed Feb. 2, 1988 now abandoned.

INT-CL: [5] G06F 15/411, G06F 12/00

US-CL-ISSUED: 395/600; 364/222.81, 364/222.82, 364/281.1, 364/282.1, 364/252.3, 364/DIG.1

US-CL-CURRENT: 707/3

FIELD-OF-SEARCH: 364/2MSFile, 364/9MSFile

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> 4121286	October 1978	Venton et al.	364/900 X
<input type="checkbox"/> 4215402	July 1980	Mitchell et al.	364/200
<input type="checkbox"/> 4447875	May 1984	Bolton et al.	364/200
<input type="checkbox"/> 4502118	February 1985	Hagenmaier, Jr. et al.	364/200
<input type="checkbox"/> 4716524	December 1987	Oxley et al.	364/200
<input type="checkbox"/> 4775932	October 1988	Oxley et al.	364/200

## OTHER PUBLICATIONS

"The Art of Computer Programming", Sorting and Searching, D. E. Knuth, Addison-Wesley Series in Computer Science and Information Processing, pp. 506-549, 1973.  
"Data Structures with Abstract Data Types and Pascal", D. F. Stubbs and N. W. Webre, Brooks/Cole Publishing Company, 1985, Section 7.4, Hashed Implementations, pp. 310-336.  
"Data Structures and Program Design", R. L. Kruse, Prentice-Hall, Inc. 1984, Section 3.7, Hashing, pp. 112-126.

ART-UNIT: 237

PRIMARY-EXAMINER: Shaw; Gareth D.

ASSISTANT-EXAMINER: Kulik; Paul

ATTY-AGENT-FIRM: Falk; James W.

## ABSTRACT:

A method and apparatus for performing storage and retrieval in an information storage system is disclosed which uses the hashing technique. In order to prevent contamination of the storage medium by automatically expiring records, a garbage collection technique is used which removes all expired records in the neighborhood of a probe into the data storage system. More particularly, each probe for insertion, retrieval or deletion of a record is an occasion to search the entire chain of records found for expired records and then removing them and closing the chain. This garbage collection automatically removes expired record contamination in the vicinity of the probe, thereby automatically decontaminating the storage space. Because no long term contamination can build up in the present system, it is useful for large data bases which are heavily used and which require the fast access provided by hashing.

8 Claims, 7 Drawing figures

**WEST**

Generate Collection

L35: Entry 1 of 3

File: USPT

Sep 15, 1998

US-PAT-NO: 5809494

DOCUMENT-IDENTIFIER: US 5809494 A

TITLE: Method for rapidly and efficiently hashing records of large databases

DATE-ISSUED: September 15, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nguyen; John N.	Belmont	MA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Applied Language Technologies, Inc.	Boston	MA	N/A	N/A	02

APPL-NO: 8/ 559532

DATE FILED: November 16, 1995

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 707/1; 364/419.19, 364/421.06, 364/410, 364/427

US-CL-CURRENT: 707/1; 701/15, 704/201, 704/231

FIELD-OF-SEARCH: 395/600, 395/601

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>4215402</u>	July 1980	Mitchell et al.	364/200
<input type="checkbox"/>	<u>4464713</u>	August 1984	Benhase et al.	364/200
<input type="checkbox"/>	<u>4959785</u>	September 1990	Yamamoto et al.	364/419
<input type="checkbox"/>	<u>4961139</u>	October 1990	Hong et al.	364/200
<input type="checkbox"/>	<u>4996663</u>	February 1991	Nemes	364/900
<input type="checkbox"/>	<u>5121495</u>	June 1992	Nemes	395/600
<input type="checkbox"/>	<u>5197002</u>	March 1993	Spencer	364/406
<input type="checkbox"/>	<u>5199073</u>	March 1993	Scott	380/49
<input type="checkbox"/>	<u>5204958</u>	April 1993	Cheng et al.	395/600
<input type="checkbox"/>	<u>5333313</u>	July 1994	Heising	395/600
<input type="checkbox"/>	<u>5359720</u>	October 1994	Tamura et al.	395/400
<input type="checkbox"/>	<u>5511190</u>	April 1996	Sharma et al.	395/600
<input type="checkbox"/>	<u>5542087</u>	July 1996	Neimat et al.	396/600

## OTHER PUBLICATIONS

Glenn Fowler, "A Flat file database query language", Usenix, pp. 1-12, Jan. 1994.

C.J.Date "Introduction Database Systems" Addison-Wesley Publishing Company, 6th ed.  
pp. 733-738, Aug. 1995.

ART-UNIT: 237

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Corriellus; Jean M.

ATTY-AGENT-FIRM: Cesari & McKenna, LLP

ABSTRACT:

A method for rapidly hashing records in a large database stored on a secondary storage device in which a set of memory-blocks are preferably established in main memory for receiving information. Each memory block is associated with a sub-range of hash values that collectively span a range of hash values derived from one or more fields of the database records. The hash values together with other information are distributed among the memory-blocks in accordance with the range of hash values. As each memory block fills, its contents are written to an intermediate file associated with the memory-block in secondary storage. The intermediate files are subsequently retrieved and the hash values stored therein are ordered. The ordered intermediate files are then written to secondary storage as a single hash table spanning the entire database.

9 Claims, 4 Drawing figures

**WEST**

Generate Collection

L28: Entry 1 of 3

File: USPT

Mar 4, 1986

US-PAT-NO: 4574346

DOCUMENT-IDENTIFIER: US 4574346 A

TITLE: Method and apparatus for peripheral data handling hierarchies

DATE-ISSUED: March 4, 1986

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hartung; Michael H.	Tucson	AZ	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
International Business Machines Corporation	Armonk	NY	N/A	N/A		02

APPL-NO: 6/ 426367

DATE FILED: September 29, 1982

INT-CL: [4] G06F 12/08, G06F 13/14

US-CL-ISSUED: 364/200

US-CL-CURRENT: 711/117; 711/112, 711/160

FIELD-OF-SEARCH: 364/2MSFile, 364/9MSFile

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>3328768</u>	June 1967	Amdahl	364/200
<input type="checkbox"/>	<u>3890601</u>	June 1975	Pietroiewicz	364/200
<input type="checkbox"/>	<u>3938097</u>	February 1976	Niguette, III	364/200
<input type="checkbox"/>	<u>3967247</u>	June 1976	Andersen et al.	364/200
<input type="checkbox"/>	<u>4080652</u>	March 1978	Cronshaw et al.	364/200
<input type="checkbox"/>	<u>4118789</u>	October 1978	Casto et al.	364/900
<input type="checkbox"/>	<u>4128882</u>	December 1978	Dennis	364/200
<input type="checkbox"/>	<u>4197580</u>	April 1980	Chang et al.	364/200
<input type="checkbox"/>	<u>4313161</u>	January 1982	Hardin et al.	364/200
<input type="checkbox"/>	<u>4403288</u>	September 1983	Christian et al.	364/200
<input type="checkbox"/>	<u>4429363</u>	January 1984	Duke et al.	364/200
<input type="checkbox"/>	<u>4466059</u>	August 1984	Bastian et al.	364/200

ART-UNIT: 237

PRIMARY-EXAMINER: Chan; Eddie P.

ATTY-AGENT-FIRM: Somermeyer; H. F.

## ABSTRACT:

Data supplied to a data storage system by a host processor has one of two use status. A first use status is that the supplied data is to be retentively stored in the data storage system. A second use status is that the supplied data is exempted from the retentive storage requirement. An example of exempted use status is that data only temporarily stored in the data storage system, i.e. is transitory. A second example is data that is being manipulated prior to retentive storage, data that is temporarily volatile. Termination of the exempted use status results in either discard or a retentive storage of the exempted use data. Data integrity controls for the exempted use status data are described. The invention is described for a data storage hierarchy environment having a volatile cache and a magnetic recorder as a backing store. The exempted use data need be stored only in or primarily in the cache while retentive data is primarily stored in the retentive store and selectively in the cache.

64 Claims, 8 Drawing figures



**WEST**

Generate Collection

L34: Entry 1 of 3

File: USPT

Feb 10, 1998

US-PAT-NO: 5717893

DOCUMENT-IDENTIFIER: US 5717893 A

TITLE: Method for managing a cache hierarchy having a least recently used (LRU) global cache and a plurality of LRU destaging local caches containing counterpart datatype partitions

DATE-ISSUED: February 10, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mattson, Richard Lewis	San Jose	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
International Business Machines Corporation	Armonk	NY	N/A	N/A		02

APPL-NO: 7/ 703309

DATE FILED: May 20, 1991

## PARENT-CASE:

This application is a continuation-in-part of application Ser. No. 07/327,204, filed Mar. 22, 1989, now abandoned.

INT-CL: [6] G06F 12/12, G06F 13/00

US-CL-ISSUED: 395/456; 395/480, 395/463

US-CL-CURRENT: 711/129

FIELD-OF-SEARCH: 395/425, 395/600, 395/456, 395/446, 395/447, 395/457, 395/497.04, 395/463, 395/487, 395/449, 395/621, 395/480

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

PAT-NO	ISSUE DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>4371929</u>	February 1983	Brann et al.	395/865
<input type="checkbox"/> <u>4430712</u>	February 1984	Coulson et al.	395/621
<input type="checkbox"/> <u>4442487</u>	April 1984	Fletcher et al.	395/449
<input type="checkbox"/> <u>4458310</u>	July 1984	Chang	395/446
<input type="checkbox"/> <u>4463424</u>	July 1984	Mattson et al.	395/463
<input type="checkbox"/> <u>4476526</u>	October 1984	Dodd	395/440
<input type="checkbox"/> <u>4503501</u>	March 1985	Coulson et al.	395/456
<input type="checkbox"/> <u>4636946</u>	January 1987	Hartung et al.	395/463
<input type="checkbox"/> <u>4754394</u>	June 1988	Brantley, Jr. et al.	395/405
<input type="checkbox"/> <u>4755930</u>	July 1988	Wilson, Jr. et al.	395/449
<input type="checkbox"/> <u>4797814</u>	January 1989	Brenza	395/403
<input type="checkbox"/> <u>4835686</u>	May 1989	Furuya et al.	395/463
<input type="checkbox"/> <u>4905141</u>	February 1990	Brenza	395/456
<input type="checkbox"/> <u>4920478</u>	April 1990	Furuya et al.	395/463
<input type="checkbox"/> <u>5043885</u>	August 1991	Robinson	395/460
<input type="checkbox"/> <u>5117350</u>	May 1992	Parrish et al.	395/401

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
203601	March 1986	EPX	
8301323	April 1983	WOX	
8402013	May 1984	WOX	

## OTHER PUBLICATIONS

"Vertical Partitioning in Cache Hierarchies," IBM Technical Disclosure Bulletin vol. 30, No. 8, Jan. 1988, p. 33.

ART-UNIT: 232

PRIMARY-EXAMINER: Gossage; Glenn

ATTY-AGENT-FIRM: Brodie; R. Bruce Klein; Ester E.

## ABSTRACT:

A method for managing a cache hierarchy having a fixed total storage capacity is disclosed. The cache hierarchy is logically partitioned to form a least recently used (LRU) global cache and a plurality of LRU destaging local caches. The global cache stores objects of all types and maintains them in LRU order. In contrast, each local cache is bound to objects having a unique data type T(i), where i is indicative of a DataType. Read and write accesses by referencing processors or central processing units (CPU's) are made to the global cache. Data not available in the global cache is staged thereto either from one of the local caches or from external storage. When a cache full condition is reached, placement of the most recently used (MRU) data element to the top of the global cache results in an LRU data element of type T(i) being destaged from the global cache to a corresponding one of the local caches storing type T(i) data. Likewise, when a cache full condition is reached in any one or more of the local caches, the local caches in turn will destage their LRU data elements to external storage. The parameters defining the partitions are externally supplied.

1 Claims, 28 Drawing figures

**WEST**

Generate Collection

L33: Entry 1 of 3

File: USPT

Jan 6, 1998

US-PAT-NO: 5706506

DOCUMENT-IDENTIFIER: US 5706506 A

TITLE: Method and apparatus for managing relational data in an object cache

DATE-ISSUED: January 6, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jensen; Richard H.	Redwood City	CA	N/A	N/A
Henninger; Derek P.	Cupertino	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Persistence Software, Inc.	San Mateo	CA	N/A	N/A	02

APPL-NO: 8/ 729262

DATE FILED: October 10, 1996

## PARENT-CASE:

This is a continuation of Ser. No. 08/409,480, filed Mar. 22, 1995, now U.S. Pat. No. 5,615,362, which is a continuation of Ser. No. 08/101,385, filed Aug. 2, 1993, now abandoned.

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 395/614; 395/445

US-CL-CURRENT: 707/103; 711/118

FIELD-OF-SEARCH: 364/DIG.1, 364/DIG.2, 395/425, 395/445, 395/600, 395/614

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>4930071</u>	May 1990	Tou et al.	364/300
<input type="checkbox"/> <u>4947320</u>	August 1990	Crus et al.	395/600
<input type="checkbox"/> <u>5212787</u>	May 1993	Baker et al.	395/600
<input type="checkbox"/> <u>5220657</u>	June 1993	Bly et al.	395/425
<input type="checkbox"/> <u>5235701</u>	August 1993	Ohler et al.	395/600
<input type="checkbox"/> <u>5261069</u>	November 1993	Wilkinson et al.	395/425
<input type="checkbox"/> <u>5263167</u>	November 1993	Conner, Jr. et al.	395/700
<input type="checkbox"/> <u>5295256</u>	March 1994	Bapat	395/500
<input type="checkbox"/> <u>5297279</u>	March 1994	Bannon et al.	395/600
<input type="checkbox"/> <u>5305389</u>	April 1994	Palmer	382/1
<input type="checkbox"/> <u>5313629</u>	May 1994	Abraham et al.	395/600
<input type="checkbox"/> <u>5315709</u>	May 1994	Alston, Jr. et al.	395/600
<input type="checkbox"/> <u>5317742</u>	May 1994	Bapat	395/700
<input type="checkbox"/> <u>5341478</u>	August 1994	Travis, Jr. et al.	395/200
<input type="checkbox"/> <u>5347477</u>	September 1994	Lee	364/709.11
<input type="checkbox"/> <u>5386527</u>	January 1995	Bosshart	395/403
<input type="checkbox"/> <u>5414827</u>	May 1995	Lin	395/462
<input type="checkbox"/> <u>5423019</u>	June 1995	Lin	395/462
<input type="checkbox"/> <u>5434990</u>	July 1995	Moussavi et al.	395/425
<input type="checkbox"/> <u>5615362</u>	March 1997	Jensen et al.	395/614

## OTHER PUBLICATIONS

Stonebraker, M. et al., "The POSTGRES next-generation database management system", Comm of the ACM, vol. 34, No. 10, Oct. 1991, pp. 78-93.  
 Stone, C.M. et al., "Database Wars Revisited: How do you decide which type of database is best when even the experts can't agree?", BYTE, vol. 15, No. 10, Oct. 1990, p. 233.

ART-UNIT: 237

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Von Buhr; Maria N.

ATTY-AGENT-FIRM: Allen; Kenneth R. Townsend and Townsend and Crew LLP

## ABSTRACT:

In an object-oriented application being executed in a digital computing system comprising a processor, a method and apparatus are provided for managing information retrieved from a structured database, such as a relational database, wherein the processor is used to construct a plurality of object instances, each of these object instances having its own unique object ID that provides a mapping between the object instance and at least one row in the structured database. The processor is used to construct a single cohesive data structure, called an object cache, that comprises all the object instances and that represents information retrieved from the structured database in a form suitable for use by one or more object-oriented applications. A mechanism for managing the object cache is provided that has these three properties: First, through a technique called key swizzling, it uses explicit relationship pointers between object instances in the object cache to reduce the volume of queries to the structured database. Second, it ensures that only one copy of an object instance is in the cache at any given time, even if several different queries return the same information from the database. Third, the mechanism guarantees the integrity of data in the cache by locking data appropriately in the structured database during a database transaction, flushing cache data at the end of each transaction, and transparently re-reading the data and reacquiring the appropriate locks for an object instance whose data has been flushed.

14 Claims, 10 Drawing figures

**WEST**☐ Generate Collection

L32: Entry 1 of 3

File: USPT

Feb 20, 1996

US-PAT-NO: 5493668

DOCUMENT-IDENTIFIER: US 5493668 A

TITLE: Multiple processor system having software for selecting shared cache entries of an associated castout class for transfer to a DASD with one I/O operation

DATE-ISSUED: February 20, 1996

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Elko; David A.	Poughkeepsie	NY	N/A	N/A
Frey; Jeffrey A.	Fishkill	NY	N/A	N/A
Mohan; Chandrasekaran	San Jose	CA	N/A	N/A
Narang; Inderpal S.	Saratoga	CA	N/A	N/A
Nick; Jeffrey M.	Fishkill	NY	N/A	N/A
Strickland; Jimmy P.	Saratoga	CA	N/A	N/A
Swanson; Michael D.	Poughkeepsie	NY	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
International Business Machines Corporation	Armonk	NY	N/A	N/A	02

APPL-NO: 7/ 860806

DATE FILED: March 30, 1992

## PARENT-CASE:

This application claims the priority date of Dec. 14, 1990, for the matter disclosed in a prior U.S. application Ser. No. 07/629,315, filed Dec. 14, 1990, by C. Mohan et al and entitled "Non-blocking Serialization for Removing Data From A Cache" which is a pending unissued application at the time of filing of this application. The contents of prior application Ser. No. 07/629,315, abandoned, is carried into this application which is a continuation-in-part of prior application Ser. No. 07/629,315, abandoned; and both applications have at least one invention in common.

INT-CL: [6] G06F 12/02, G06F 13/00

US-CL-ISSUED: 395/457; 395/440, 395/200.08, 364/228.1, 364/243.41, 364/246.3, 364/243.7

US-CL-CURRENT: 711/130; 711/113

FIELD-OF-SEARCH: 395/425, 395/275, 395/250, 395/200, 364/200

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

<input type="checkbox"/>	PAT-NO	ISSUE DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>4317168</u>	February 1982	Messina et al.	395/250
<input type="checkbox"/>	<u>4441155</u>	April 1984	Fletcher et al.	364/200
<input type="checkbox"/>	<u>4445174</u>	April 1984	Fletcher	364/200
<input type="checkbox"/>	<u>4603382</u>	July 1986	Cole et al.	395/250
<input type="checkbox"/>	<u>4636946</u>	January 1987	Hartung et al.	364/200
<input type="checkbox"/>	<u>5113514</u>	May 1992	Albonesi et al.	395/425
<input type="checkbox"/>	<u>5142627</u>	August 1992	Elliot et al.	395/275
<input type="checkbox"/>	<u>5163148</u>	November 1992	Walls	395/600
<input type="checkbox"/>	<u>5386546</u>	January 1995	Hamaguchi	395/425

ART-UNIT: 237

PRIMARY-EXAMINER: Lee; Thomas C.

ASSISTANT-EXAMINER: Weinstein; Marc K.

ATTY-AGENT-FIRM: Goldman; Bernard M.

## ABSTRACT:

A high-speed cache is shared by a plurality of independently-operating data systems in a multi-system data sharing complex. Each data system has access both to the high-speed cache and the lower-speed, secondary storage for obtaining and storing data. Management logic and the high-speed cache assures that a block of data obtained from the cache for entry into the secondary storage will be consistent with the version of the block of data in the shared cache with non-blocking serialization allowing access to a changed version in the cache while castout is being performed. Castout classes are provided to facilitate efficient movement from the shared cache to DASD.

35 Claims, 27 Drawing figures

**WEST**

Generate Collection

L30: Entry 1 of 3

File: USPT

Aug 10, 1993

US-PAT-NO: 5235701

DOCUMENT-IDENTIFIER: US 5235701 A

TITLE: Method of generating and accessing a database independent of its structure and syntax

DATE-ISSUED: August 10, 1993

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ohler; Peter C.	Lafayette	CA	N/A	N/A
Gu; Xin	Albany	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Teknekron Communications Systems, Inc.	Berkeley	CA	N/A	N/A	02

APPL-NO: 7/ 574587

DATE FILED: August 28, 1990

INT-CL: [5] G06F 15/40

US-CL-ISSUED: 395/600; 395/425, 364/DIG.1, 364/282.1, 364/283.4, 364/280, 364/280.4

US-CL-CURRENT: 707/1

FIELD-OF-SEARCH: 395/600, 395/700, 395/425

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

Search Selected

Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> 4774661	September 1988	Kumpati	395/600
<input type="checkbox"/> 4930071	May 1990	Tou et al.	395/600

## OTHER PUBLICATIONS

Fishman, D. H., et al., "Iris: An Object-Oriented Database Management System", ACM Transactions on Office Information Systems, vol. 5, No. 1, Jan. 1987, pp. 48-69.  
Duff, Charles B., "Designing an Efficient Language," Byte, Aug. 1986, pp. 211-224.  
Declaration of Peter C. Ohler, filed Jun. 24, 1991 and the Agreement attached thereto.

ART-UNIT: 237

PRIMARY-EXAMINER: Kulik; Paul V.

ATTY-AGENT-FIRM: Limbach &amp; Limbach

## ABSTRACT:

A method of generating and accessing a database table having data stored in a unique structure and syntax is disclosed. A database access library having an access function is created. The access function of the database access library is mapped to the database table. A data object is also created. The data object has a plurality of data attributes. Each data attribute of the data object is mapped to the database table using the access function. Accessing of the data object is independent of the structure and syntax of the database table.

3 Claims, 2 Drawing figures





**WEST**☐ Generate Collection

L27: Entry 1 of 5

File: USPT

Dec 20, 1983

US-PAT-NO: 4422145

DOCUMENT-IDENTIFIER: US 4422145 A

TITLE: Thrashing reduction in demand accessing of a data base through an LRU paging buffer pool

DATE-ISSUED: December 20, 1983

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sacco; Giovanni M.	Turin	N/A	N/A	ITX
Schkolnick; Mario	Monte Sereno	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
International Business Machines Corporation	Armonk NY	N/A	N/A	N/A	02	

APPL-NO: 6/ 334272

DATE FILED: October 26, 1981

## PCT-DATA:

APPL-NO	DATE-FILED	PUB-NO	PUB-DATE	371-DATE	102 (E) -DATE
PCT/US81/01109	August 18, 1981	WO83/00758	Mar 3, 1983	Oct 26, 1981	Oct 26, 1981

INT-CL: [3] G11C 9/06

US-CL-ISSUED: 364/300; 364/200

US-CL-CURRENT: 711/160

FIELD-OF-SEARCH: 364/200, 364/300, 364/900

## PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

Search Selected

Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> 235806	February 1981	Mattson et al.	N/A
<input type="checkbox"/> 3806883	April 1974	Weisbecker	364/200
<input type="checkbox"/> 3958228	May 1976	Coombes et al.	364/200
<input type="checkbox"/> 4035778	July 1977	Ghanem	364/200
<input type="checkbox"/> 4059850	November 1977	Van Eck et al.	364/200
<input type="checkbox"/> 4168541	September 1979	De Karske	364/200

## OTHER PUBLICATIONS

Lang, et al., "Data Base Buffer Paging in Virtual Storage Systems", ACM Transactions on Data Base Systems, Dec. 1977, pp. 339-351.

Selinger, et al., "Access Path Selection in a Relational Data Base", Proc. 1979, Sigmod Conf. of ACM, pp. 22-34.

IBM General Information and Concepts and Installation Manuals, GH24-5012 and GH24-5013, Jan. 1981.

Denning, "The Working Set Model for Programmed Behavior", Communication of ACM, vol. 11,

May 1968, pp. 323-333.

Shaw, "The Logical Design of Operating Systems", 1974, pp. 138-144.

Coffman, "Operating Systems Theory", Prentice-Hall, pp. 298-299, 1973.

ART-UNIT: 232

PRIMARY-EXAMINER: Zache; Raulfe B.

ATTY-AGENT-FIRM: Brodie; R. Bruce

ABSTRACT:

A CPU implementable method for minimizing thrashing among concurrent processes demand page accessing a data base through an LRU page organized buffer pool. There is ascertained the set of pages over which there is looping access behavior for the prospectively executing concurrent processes. This parameter, as determined for each task, is passed to the storage accessing component which partitions the buffer into LRU stacks and dynamically adjusts the stack to this predicted parameter size.

9 Claims, 4 Drawing figures

**WEST**

Generate Collection

L2: Entry 4 of 14

File: USPT

Sep 28, 1999

US-PAT-NO: 5960434

DOCUMENT-IDENTIFIER: US 5960434 A

TITLE: System method and computer program product for dynamically sizing hash tables

DATE-ISSUED: September 28, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schimmel; Curt F.	San Ramon	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Silicon Graphics, Inc.	Mountain View	CA	N/A	N/A	02

APPL-NO: 8/ 938672

DATE FILED: September 26, 1997

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 707/100; 707/101, 707/102, 707/103

US-CL-CURRENT: 707/100; 707/101, 707/102

FIELD-OF-SEARCH: 707/100, 707/101, 707/102, 707/103

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>4996663</u>	February 1991	Nemes	364/900
<input type="checkbox"/> <u>5121495</u>	June 1992	Nemes	707/100
<input type="checkbox"/> <u>5197002</u>	March 1993	Spencer	364/406
<input type="checkbox"/> <u>5265245</u>	November 1993	Nordstrom et al.	707/101
<input type="checkbox"/> <u>5287499</u>	February 1994	Nemes	707/100
<input type="checkbox"/> <u>5511190</u>	April 1996	Sharma et al.	707/102
<input type="checkbox"/> <u>5612865</u>	March 1997	Dasgupta	364/184
<input type="checkbox"/> <u>5623545</u>	April 1997	Childs et al.	380/2
<input type="checkbox"/> <u>5706462</u>	January 1998	Matousek	395/445

## OTHER PUBLICATIONS

Keller, Fast Rehashing in PRAM Emulations, IEEE, pp. 626-631, Dec. 1993.  
Chung et al, Dynamic Signature Hashing, IEEE, pp. 257-262, Sep. 1989.

ART-UNIT: 271

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Coby; Frantz

ATTY-AGENT-FIRM: Sterne, Kessler, Goldstein &amp; Fox, P.L.L.C.

## ABSTRACT:

The present invention is a system, method, and computer program product for dynamically sizing a hash table when the average number of records per bucket in the hash table exceeds a maximum average number of records per bucket. In one embodiment, the hash table employs a modulo hashing function. In a second embodiment, the number of buckets is grown by a multiple of the previous number of buckets and records are re-hashed using a lazy re-hashing modulo algorithm that re-hashes records in a hash bucket only when those records are searched. In the second embodiment, when a hash table is re-sized, each new bucket is provided with a logical back pointer, or index, to a pre-existing bucket that potentially contains records that belong in the new bucket. When a search is directed at a new bucket, the logical back pointer, or index, directs the search to a pre-existing bucket. When a search of a pre-existing bucket finds a data record that belongs in a new bucket, the record is moved to the new bucket. When there are no more records in a pre-existing bucket that belong in a new bucket, the logical back pointer from the new bucket to the pre-existing bucket is removed. Preferably, the logical back pointer is stored in the bucket where a regular pointer would normally be stored so that no extra space is needed.

24 Claims, 15 Drawing figures

**WEST**

Generate Collection

L2: Entry 5 of 14

File: USPT

Apr 6, 1999

US-PAT-NO: 5893120

DOCUMENT-IDENTIFIER: US 5893120 A

TITLE: Methods and apparatus for information storage and retrieval using a hashing technique with external chaining and on-the-fly removal of expired data

DATE-ISSUED: April 6, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nemes; Richard Michael	Brooklyn	NY	11234-2604	N/A

APPL-NO: 8/ 775864

DATE FILED: January 2, 1997

## PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS Not Applicable STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT Not Applicable REFERENCE TO A MICROFICHE APPENDIX Not Applicable

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 707/206; 707/1, 707/100, 707/101, 707/202

US-CL-CURRENT: 707/206; 707/1, 707/100, 707/101, 707/202

FIELD-OF-SEARCH: 707/1, 707/200-206, 707/2, 707/100-103

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>5121495</u>	June 1992	Nemes	707/3
<input type="checkbox"/> <u>5202981</u>	April 1993	Shackelford	707/1
<input type="checkbox"/> <u>5287499</u>	February 1994	Nemes	707/206

## OTHER PUBLICATIONS

D.E. Knuth, The Art of Computer Programming, vol. 3, Sorting and Searching, Addison-Wesley, Reading, Massachusetts, 1973, pp. 506-549.  
R.L. Kruse, Data Structures and Program Design, Second Edition, Prentice-Hall, Englewood Cliffs, New Jersey, 1987, Section 6.5, "Hashing," and Section 6.6, Analysis of Hashing, pp. 198-215.  
D. F. Stubbs and N.W. Webre, Data Structure with Abstract Data Types and Pascal, Brooks/Cole Publishing Company, Monterey, California, 1985, Section 7.4, "Hased Implementations," pp. 310-336.

ART-UNIT: 271

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Alam; Hosain T.

ABSTRACT:

A method and apparatus for performing storage and retrieval in an information storage system is disclosed that uses the hashing technique with the external chaining method for collision resolution. In order to prevent performance deterioration due to the presence of automatically expiring data items, a garbage collection technique is used that removes all expired records stored in the system in the external chain targeted by a probe into

[http://westbrs:8820/bin/gate.exe?doc&...c 2=&p\\_doc 3=&p\\_doc 4=&p\\_doc 5=&p\\_doc 6=](http://westbrs:8820/bin/gate.exe?doc&...c 2=&p_doc 3=&p_doc 4=&p_doc 5=&p_doc 6=)  
all expired records stored in the system in the external chain targeted by a probe into  
the data storage system, more particularly, each insertion, retrieval, or deletion of a  
record is an occasion to search an entire linked-list chain of records for expired items  
and then remove them. Because an expired data item will not remain in the system long  
term if the system is frequently probed, it is useful for large information storage  
systems that are heavily used, require the fast access provided by hashing, and cannot be  
taken off-line for removal of expired data.

8 Claims, 7 Drawing figures

**WEST**

Generate Collection

L2: Entry 6 of 14

File: USPT

Sep 15, 1998

US-PAT-NO: 5809494

DOCUMENT-IDENTIFIER: US 5809494 A

TITLE: Method for rapidly and efficiently hashing records of large databases

DATE-ISSUED: September 15, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nguyen; John N.	Belmont	MA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Applied Language Technologies, Inc.	Boston	MA	N/A	N/A	02

APPL-NO: 8/ 559532

DATE FILED: November 16, 1995

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 707/1; 364/419.19, 364/421.06, 364/410, 364/427

US-CL-CURRENT: 707/1; 701/15, 704/201, 704/231

FIELD-OF-SEARCH: 395/600, 395/601

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>4215402</u>	July 1980	Mitchell et al.	364/200
<input type="checkbox"/>	<u>4464713</u>	August 1984	Benhase et al.	364/200
<input type="checkbox"/>	<u>4959785</u>	September 1990	Yamamoto et al.	364/419
<input type="checkbox"/>	<u>4961139</u>	October 1990	Hong et al.	364/200
<input type="checkbox"/>	<u>4996663</u>	February 1991	Nemes	364/900
<input type="checkbox"/>	<u>5121495</u>	June 1992	Nemes	395/600
<input type="checkbox"/>	<u>5197002</u>	March 1993	Spencer	364/406
<input type="checkbox"/>	<u>5199073</u>	March 1993	Scott	380/49
<input type="checkbox"/>	<u>5204958</u>	April 1993	Cheng et al.	395/600
<input type="checkbox"/>	<u>5333313</u>	July 1994	Heising	395/600
<input type="checkbox"/>	<u>5359720</u>	October 1994	Tamura et al.	395/400
<input type="checkbox"/>	<u>5511190</u>	April 1996	Sharma et al.	395/600
<input type="checkbox"/>	<u>5542087</u>	July 1996	Neimat et al.	396/600

## OTHER PUBLICATIONS

Glenn Fowler, "A Flat file database query language", Usenix, pp. 1-12, Jan. 1994.

C.J.Date "Introduction Database Systems" Addison-Wesley Publishing Company, 6th ed.  
pp. 733-738, Aug. 1995.

ART-UNIT: 237

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Corrielus; Jean M.

ATTY-AGENT-FIRM: Cesari & McKenna, LLP

ABSTRACT:

A method for rapidly hashing records in a large database stored on a secondary storage device in which a set of memory-blocks are preferably established in main memory for receiving information. Each memory block is associated with a sub-range of hash values that collectively span a range of hash values derived from one or more fields of the database records. The hash values together with other information are distributed among the memory-blocks in accordance with the range of hash values. As each memory block fills, its contents are written to an intermediate file associated with the memory-block in secondary storage. The intermediate files are subsequently retrieved and the hash values stored therein are ordered. The ordered intermediate files are then written to secondary storage as a single hash table spanning the entire database.

9 Claims, 4 Drawing figures



**WEST**

Generate Collection

**Search Results - Record(s) 1 through 14 of 14 returned.**☐ 1. Document ID: US 6115802 A

L2: Entry 1 of 14

File: USPT

Sep 5, 2000

US-PAT-NO: 6115802

DOCUMENT-IDENTIFIER: US 6115802 A

TITLE: Efficient hash table for use in multi-threaded environments

DATE-ISSUED: September 5, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Tock; Theron D.	Sunnyvale	CA	N/A	N/A
Wong; Thomas K.	Pleasanton	CA	N/A	N/A

US-CL-CURRENT: 711/216; 707/1, 707/200

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 2. Document ID: US 6088685 A

L2: Entry 2 of 14

File: USPT

Jul 11, 2000

US-PAT-NO: 6088685

DOCUMENT-IDENTIFIER: US 6088685 A

TITLE: Open end mutual fund securitization process

DATE-ISSUED: July 11, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kiron; Kenneth	New York	NY	N/A	N/A
Bander; Kevin S.	Bayside	WI	N/A	N/A

US-CL-CURRENT: 705/36; 705/35

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 3. Document ID: US 5991859 A

L2: Entry 3 of 14

File: USPT

Nov 23, 1999

US-PAT-NO: 5991859

DOCUMENT-IDENTIFIER: US 5991859 A

TITLE: Semiconductor storage device having on-the-fly adaptable storage capacity

DATE-ISSUED: November 23, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nagasawa; Yumiko	Tokyo	N/A	N/A	JPX
Maeda; Shigeyuki	Kawasaki	N/A	N/A	JPX

US-CL-CURRENT: 711/170; 711/154, 711/162, 711/171, 711/172

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw Desc	Image
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☐ 4. Document ID: US 5960434 A

L2: Entry 4 of 14

File: USPT

Sep 28, 1999

US-PAT-NO: 5960434

DOCUMENT-IDENTIFIER: US 5960434 A

TITLE: System method and computer program product for dynamically sizing hash tables

DATE-ISSUED: September 28, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schimmel; Curt F.	San Ramon	CA	N/A	N/A

US-CL-CURRENT: 707/100; 707/101, 707/102

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 5. Document ID: US 5893120 A

L2: Entry 5 of 14

File: USPT

Apr 6, 1999

US-PAT-NO: 5893120

DOCUMENT-IDENTIFIER: US 5893120 A

TITLE: Methods and apparatus for information storage and retrieval using a hashing technique with external chaining and on-the-fly removal of expired data

DATE-ISSUED: April 6, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nemes; Richard Michael	Brooklyn	NY	11234-2604	N/A

US-CL-CURRENT: 707/206; 707/1, 707/100, 707/101, 707/202

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 6. Document ID: US 5809494 A

L2: Entry 6 of 14

File: USPT

Sep 15, 1998

US-PAT-NO: 5809494

DOCUMENT-IDENTIFIER: US 5809494 A

TITLE: Method for rapidly and efficiently hashing records of large databases

DATE-ISSUED: September 15, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nguyen; John N.	Belmont	MA	N/A	N/A

US-CL-CURRENT: 707/1; 701/15, 704/201, 704/231

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 7. Document ID: US 5806048 A

L2: Entry 7 of 14

File: USPT

Sep 8, 1998

US-PAT-NO: 5806048

DOCUMENT-IDENTIFIER: US 5806048 A

TITLE: Open end mutual fund securitization process

DATE-ISSUED: September 8, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kiron; Kenneth	NY	NY	N/A	N/A
Bander; Kevin S.	Chicago	IL	N/A	N/A

US-CL-CURRENT: 705/36; 705/35

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 8. Document ID: US 5732214 A

L2: Entry 8 of 14

File: USPT

Mar 24, 1998

US-PAT-NO: 5732214

DOCUMENT-IDENTIFIER: US 5732214 A

TITLE: System for universal archival service where transfer is initiated by user or service and storing information at multiple locations for user selected degree of confidence

DATE-ISSUED: March 24, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Subrahmanyam; Pasupathi Ananta	Freehold	NJ	N/A	N/A

US-CL-CURRENT: 709/227; 709/217

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 9. Document ID: US 5649109 A

L2: Entry 9 of 14

File: USPT

Jul 15, 1997

US-PAT-NO: 5649109

DOCUMENT-IDENTIFIER: US 5649109 A

TITLE: Apparatus and method for maintaining forwarding information in a bridge or router using multiple free queues having associated free space sizes

DATE-ISSUED: July 15, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Griesmer; Martin Edward	Arlington	MA	N/A	N/A
Krishnakumar; Parayath Gopal	West Newton	MA	N/A	N/A
Benson; David	Acton	MA	N/A	N/A

US-CL-CURRENT: 709/242; 370/241, 370/401

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 10. Document ID: US 5555405 A

L2: Entry 10 of 14

File: USPT

Sep 10, 1996

US-PAT-NO: 5555405

DOCUMENT-IDENTIFIER: US 5555405 A

TITLE: Method and apparatus for free space management in a forwarding database having forwarding entry sets and multiple free space segment queues

DATE-ISSUED: September 10, 1996

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Griesmer; Martin E.	Arlington	MA	N/A	N/A
Benson; David	Acton	MA	N/A	N/A

US-CL-CURRENT: 707/205; 370/401, 370/411, 370/412

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 11. Document ID: US 5542089 A

L2: Entry 11 of 14

File: USPT

Jul 30, 1996

US-PAT-NO: 5542089

DOCUMENT-IDENTIFIER: US 5542089 A

TITLE: Method and apparatus for estimating the number of occurrences of frequent values in a data set

DATE-ISSUED: July 30, 1996

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lindsay; Bruce G.	San Jose	CA	N/A	N/A
Shekita; Eugene J.	San Jose	CA	N/A	N/A

US-CL-CURRENT: 707/2

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 12. Document ID: US 5423038 A

L2: Entry 12 of 14

File: USPT

Jun 6, 1995

US-PAT-NO: 5423038

DOCUMENT-IDENTIFIER: US 5423038 A

TITLE: Specialized data management method

DATE-ISSUED: June 6, 1995

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Davis; Marilyn	Palo Alto	CA	94306	N/A

US-CL-CURRENT: 705/12; 345/751, 709/313

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 13. Document ID: US 5414704 A

L2: Entry 13 of 14

File: USPT

May 9, 1995

US-PAT-NO: 5414704

DOCUMENT-IDENTIFIER: US 5414704 A

TITLE: Address lookup in packet data communications link, using hashing and content-addressable memory

DATE-ISSUED: May 9, 1995

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Spinney; Barry A.	Wayland	MA	N/A	N/A

US-CL-CURRENT: 370/389; 707/1, 711/108, 711/216

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw Desc	Image
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☐ 14. Document ID: US 5396624 A

L2: Entry 14 of 14

File: USPT

Mar 7, 1995

US-PAT-NO: 5396624

DOCUMENT-IDENTIFIER: US 5396624 A

TITLE: Account file for off-line transaction authorization

DATE-ISSUED: March 7, 1995

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Campbell, Jr.; Carl M.	Newtown Square	PA	N/A	N/A

US-CL-CURRENT: 705/44; 235/380, 707/1, 707/9

Full	Title	Citation	Front	Review	Classification	Date	Reference
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KWIC	Draw. Desc	Image
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Terms	Documents
5121495.uref.	14

Documents, starting with Document:

Display Format: